# Information Paper 

# Experimental Estimates for Australian Industry adjusted for Off-June Year Reporting 

## Australia

2011-12

IN Q U IRIES

## Information Paper

# Experimental Estimates for Australian Industry adjusted for Off-June Year Reporting 

## Australia

2011-12

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## ABBREVIATIONS

| $\$ \mathbf{b}$ | billion (thousand million) dollars |
| ---: | :--- |
| $\$ \mathbf{m}$ | million dollars |
| ABS | Australian Bureau of Statistics |
| ABSBR | Australian Bureau of Statistics Business Register |
| ANZSIC | Australian and New Zealand Standard Industrial Classification |
| cat. no. | Catalogue number |
| EAS | Economic Activity Survey |
| GST | goods and services tax |
| IVA | industry value added |
| QBIS | Quarterly Business Indicators Survey |
| RSE | relative standard error |

This information paper explains how businesses reporting data on a non-standard financial year basis can impact on the estimates published in Australian Industry (cat. no. 8155.0), and describes an experimental methodology designed to measure the impact of this phenomenon on published data.

The estimates presented in Australian Industry (cat. no. 8155.0) are derived from the Economic Activity Survey (EAS), and generally represent the 12 month period ended 30 June. However, where businesses are unable to provide data on this basis, an alternate, or off-June accounting period is used. As a result, in some instances estimates may reflect trading conditions occurring outside of the published reference year.

By its nature, off-June reporting is more prevalent in industries with a high degree of foreign ownership, such as Mining, Manufacturing and Wholesale trade, as many countries have different standard accounting periods to Australia. Some local businesses also report for an 'off-June' year for logistical or operational purposes.

Where trading conditions are stable across years, the effect of off-June year reporting is expected to be minimal, but when levels of activity in an industry change quickly, estimates might be more substantially affected. Often, this occurs as a result of price fluctuations or one-off extraordinary events that impact on industry performance.

This paper describes an experimental methodology designed to produce estimates for all businesses on the same June year end reporting basis. The methodology uses data collected through the Quarterly Business Indicators Survey (QBIS) to model the impact of off-June year reporting on selected Australian and New Zealand Standard Industrial Classification (ANZSIC) (cat. no. 1292.0) industry subdivisions. Using QBIS data, 'off-June year' factors are generated that, when applied to EAS data remove the impact of off-June reporting on estimates. A detailed explanation of the methodology can be found in Chapter 2.

The result is a set of experimental estimates adjusted for off-June year reporting. These experimental estimates, along with the original estimates published in Australian Industry (cat. no. 8155.0) are presented by ANZSIC division for selected data items in the Appendix of this paper. The data items are wages and salaries, total income, total expenses and industry value added (IVA), presented for the reference years 2009-10, 2010-11 and 2011-12.

Chapter 3 contains a summary of the effects of the off-June adjustments on EAS data. Care should be taken when using these experimental estimates as modelling may introduce an element of error. Information concerning the reliability of estimates is described in Chapter 4.

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CHAPTER 1 • INTRODUCTION
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USER COMMENTS AND FURTHER INFORMATION

RELATED PUBLICATIONS

ACKNOWLEDGEMENT

The Australian Bureau of Statistics (ABS) is interested in feedback from users of these statistics. Users are invited to contact Annual Integrated Collections at [australian.industry.statistics@abs.gov.au](mailto:australian.industry.statistics@abs.gov.au) for comment or to seek clarification on any aspect of this release. Please also note that there are no additional data available by request. The ABS is continuing to evaluate this experimental methodology with a view to possible changes in the future.

Other ABS products which may be of interest are listed below, and are available free of charge from the ABS website www.abs.gov.au:

Australian Industry, 2011-12 (cat. no. 8155.0), issued annually

Business Indicators, Mar 2013 (cat. no. 5676.0), issued quarterly

ABS publications draw extensively on information provided freely by individuals, businesses, governments and other organisations. Their continued cooperation is very much appreciated; without it, the wide range of statistics published by the ABS would not be available. Information received by the ABS is treated in strict confidence as required by the Census and Statistics Act 1905.

The estimates presented in this paper are classified by industry, in accordance with the 2006 edition of the Australian and New Zealand Standard Industrial Classification (ANZSIC) (cat. no. 1292.0).

The scope of the experimental estimates in this paper is based on the EAS, with further constraints imposed to match the scope of QBIS. For a detailed explanation of the scope and methodology of these surveys see Explanatory Notes for Australian Industry (cat. no. 8155.0) and Business Indicators (cat. no. 5676.0). In brief, the scope of the experimental estimates in this paper consists of all business entities on the Australian Bureau of Statistics Business Register (ABSBR) operating in the Australian economy during the reference period, except for:

- In most industries, entities classified to Standard Institutional Sector Classification of Australia (SISCA) Sector 3 General government. The one industry for which general government units are included is Water supply, sewerage and drainage services (ANZSIC Subdivision 28, within Division D Electricity, gas, water and waste);
- Entities classified to ANZSIC Subdivision 96 Private households employing staff, anZSIC Subdivision 75 Public administration and ANZSIC Subdivisions 76 Defence which are out of scope for EAS;
- Entities classified to ANZSIC Subdivision 62 Finance and ANZSIC Subdivision 63 Insurance and superannuation funds which are not surveyed in EAS and ANZSIC Subdivision 64 Auxiliary finance and insurance services which are not included in Australian Industry (cat. no. 8155.0) tables; and
- Entities classified to ANZSIC Division A Agriculture, forestry and fishing, and ANZSIC Subdivision 77 Public order, saftey and regulatory services which are not included in QBIS and as such no adjustments could be applied to the reporting dates for business classified to these industries.

While Education and training and Health care and social assistance (ANZSIC Divisions P and Q, respectively) are conceptually in scope of these analyses, QBIS only collects information on wages and salaries for these ANZSIC Divisions. Thus no adjustment has been applied to sales and service income, other expenses and inventories.

Additionally, entities with an employment size of less than 20 on the ABSBR are within scope of the experimental estimates, but are ineligible for adjustment. Data reported by these businesses still contribute to the estimates, but are not adjusted as part of the process described below. Such conditions of the methodology are explained in Chapter
4. The scope of off-June adjusted experimental estimates is summarised in Figure 2.1.

SCOPE AND POPULATION
continued

FIGURE 2.1. SCOPE OF THE EXPERIMENTAL ESTIMATES


The 2011-12 EAS had a reference period ending 30 June 2012; that is, the aim of the EAS was to measure economic activity over the 12 months from 1 July 2011 to 30 June 2012. Analysis of data from EAS shows that the majority of businesses report for this reference period, but for some industries a substantial proportion report for some other reference period. As noted previously, off-June reporting is more prevalent in industries with a high degree of foreign ownership, such as Mining, Manufacturing and Wholesale trade, as many countries use different accounting periods to Australia.

Considering the 2011-12 EAS, the types of 'off-June' reporting periods typically observed were:

- reporting period ending 31 December 2011;
- reporting period ending 31 March 2012; and
- reporting period ending 30 September 2012.

Consequently, where most data reported in Australian Industry (cat. no. 8155.0) are for the 12 months ending 30 June, some data can be reported for periods including the previous one or two quarters, or including the succeeding quarter, as demonstrated in Figure 2.2.

FIGURE 2.2. THE 2011-12 ECONOMIC ACTIVITY SURVEY REFERENCE PERIOD AND OBSERVED PERIODS OF OFF-JUNE REPORTING


THE OFF-JUNE
REPORTING PROBLEM
continued

Table 2.1 gives an estimate of the percentage of the population likely to report on a financial year basis, and their contribution to total IVA. It presents the off-June reporting businesses which received an adjustment as part of the process described below.

Although businesses reporting for an off-June financial year may be in the minority, their contribution to overall estimates of IVA can be substantial. An example is the mining industry, with $3 \%$ of businesses in the December quarter reporting for a non-standard financial year, contributing $52 \%$ of total IVA.

## 2.1

PREVALANCE OF OFF-JUNE YEAR REPORTING IN EAS 2011-12, AND THE CONTRIBUTION OF THESE BUSINESSES TO IVA


- nil or rounded to zero (including null cells)
np not available for publication but included in totals where applicable, unless otherwise indicated
(a) Includes all businesses in scope of the experimental estimates, except for non-employing entities below a certain turnover threshold. Other businesses with less than 20 employees are included in the JUN category.

The impact of off-June reporting can vary between data items; that is, not only does the incidence and impact of off-June year reporting differ by industry subdivision, it also impacts upon the following data items differently:

- Sales and service income;
- Wages and salaries;
- Other expenses;
- Closing inventories of raw materials;
- Opening inventories of raw materials;
- Closing inventories of finished goods (including work-in-progress); and
- Opening inventories of finished goods (including work-in-progress).

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THE OFF-JUNE
REPORTING PROBLEM
continued
```


## METHODOLOGY

Creating subdivision off-June year factors

Consequently, it was necessary to adjust these individual measures to satisfactorily account for each of the different types of off-June reporting within each ANZSIC subdivision.

This paper describes a new methodology developed with the aim of measuring and removing the impact of off-June reporting on estimates published in Australian Industry (cat. no. 8155.0)

In summary the experimental estimates presented in the Appendix of this paper were derived by the following process:

- For each in-scope EAS ANZSIC subdivision, subdivision off-June factors were determined for each data item and each of the off-June reporting types;
- QBIS units with incorrectly reported or unrepresentative data in the ANSZIC subdivision were removed from contributing to the subdivision factors;
- Significant EAS units that were also selected in the QBIS collection were assessed for appropriateness to receive an individualised (unit) off-June factor (instead of receiving a subdivision factor);
- Off-June reporting EAS businesses were then assigned either a unit factor (if deemed appropriate) or its respective ANZSIC subdivision and off-June type factor. New values are calculated for these businesses, representing an estimate of how the business would have reported for the standard financial year (that is, 1 July to 30 June). Final aggregated data is then produced on a standard financial year basis.

It was necessary to create twenty-one separate factors for each in scope ANZSIC subdivision, as demonstrated in Table 2.2.

22 THE 21 OFF-JUNE YEAR MODELLING FACTORS REQUIRED FOR EACH ANZSIC SUBDIVISION

|  | Sales and service income | Wages and salaries | Other expenses | Closing inventories of raw materials | Opening inventories of raw materials | Closing inventories of finished goods | Opening inventories of finished goods |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ANZSIC Subdivision | Dec-11 | Dec-11 | Dec-11 | Dec-11 | Dec-11 | Dec-11 | Dec-11 |
| ANZSIC Subdivision | Mar-12 | Mar-12 | Mar-12 | Mar-12 | Mar-12 | Mar-12 | Mar-12 |
| ANZSIC Subdivision | Sep-12 | Sep-12 | Sep-12 | Sep-12 | Sep-12 | Sep-12 | Sep-12 |

The factors were formulated from a subset of businesses sampled in the QBIS which met the following criteria:

- For sales and service income, wages and salaries and other expenses factors: Reported a non-zero value for these data items for the seven relevant quarters which cover all possible types of reporting periods. For example, for 2011-12 the relevant quarters are March 2011 through September 2012. This condition eliminated businesses which either started up or closed down during the period;
- For inventory factors: Reported a non-zero value for sales and service income and inventories for eight relevant quarters (December 2010 through September 2012 to ensure an opening inventory value;

Creating subdivision off-June year factors continued

- Did not report a value for the above items in one quarter greater than 10 times that of an adjacent quarter. This condition eliminated businesses with extreme values; and
- Had an employment size of 20 or more. This removed small businesses, whose data are not expected to be impacted by off-June reporting in the EAS.

Where there were five or less contributing QBIS businesses in an ANZSIC subdivision, it was considered that the number of observations was insufficient for producing the off-June factors. In those cases the off-June factors were produced at ANZSIC division level.

Sales and service income, other expenses and inventories factors were not generated for Education and training and Health care and social assistance (ANZSIC Divisions P and Q respectively), as the information is not collected by QBIS (see Scope and Population above). For the same reason, inventory factors could only be generated for Mining, Manufacturing, Wholesale trade, Retail trade, Accommodation and food services (ANZSIC Divisions B, C, F, G and H respectively) and two subdivisions in the Electricity, gas, water and waste services Division; Electricity supply and gas supply (ANZSIC Subdivisions 26 and 27 respectively).

For each data item, quarterly weighted QBIS data reported by the subset of businesses established above were summed to give an aggregate value for each in scope ANZSIC subdivision. These aggregate quarterly values were then used to create factors that model the impact of off-June reporting for each of the four data items, by each in scope subdivision

To calculate each factor, a ratio of the summed data from the four quarters of the standard financial year is divided by the summed annualised data from the four quarters of the relevant off-June reporting period, as described by Equation 2.1.

EQUATION 2.1. CALCULATING OFF-JUNE FACTORS

$$
\begin{aligned}
& \text { Off }- \text { JuneFactor } r_{D E C}=\frac{\left({\underset{\sim}{S E P 11}}^{Q_{\sim}}+{\underset{\sim}{D E C 11}}^{Q_{M A R 11}}+{\underset{\sim}{\sim}}_{\text {JUN11 }}+{\underset{\sim}{M A R 12}}^{Q_{S E P 11}}+{\underset{\sim}{\sim}}_{\text {JUN } 12}\right)}{{\underset{\sim}{D E C 11}})}
\end{aligned}
$$

where Q is quarterly QBIS data aggregated by industry subdivision for the subset of businesses identified above.

Since inventories are stock variables (that is, represent a quantity existing at a particular point in time) the formulae for deriving inventories factors differed slightly, as described by Equation 2.2.

Creating subdivision
off-June year factors
continued

## EQUATION 2.2. CALCULATING OFF-JUNE INVENTORIES FACTORS

$$
\begin{aligned}
& \text { InventoriesFactor }_{D E C}=\frac{\left({\underset{\sim}{U n v}}_{J U N 12}\right)}{\left(\text { OInv }_{D E C 11}\right)} \\
& \text { InventoriesFactor }_{M A R}=\frac{\left({\underset{\sim}{Q}}^{\left(\text {Inv}_{J U N 12}\right)}\right.}{\text { Inv } \left._{M A R 12}\right)} \\
& \text { InventoriesFactor }_{S E P}=\frac{\left({\underset{\sim}{Q}}^{\left(\text {Inv }_{J U N 12}\right)}\right.}{\left(\text { Inv }_{S E P 12}\right)}
\end{aligned}
$$

Factors were produced for opening and closing inventories, by type of inventory. The types of inventories specified were raw materials inventories and finished goods inventories (including work-in-progress).

The factors generated in these equations give an indication of the variability in trading conditions between off-June reporting periods and the standard Australian financial year. A factor of 1 indicates no variability, implying there is no effect of off-June reporting on estimates published in Australian Industry (cat. no. 8155.0). Conversely, the further a factor lies from 1, the greater the impact of off-June reporting on industry estimates.

An example of the calculation of factors for Subdivision 14, Wood product manufacturing is provided below. Quarterly sales and service income estimates derived from in-scope QBIS data (see Table 2.3) were used to produce off-June factors (see Example 2.1) which were applied to EAS estimates of sales and service income.

CALCULATING FACTORS - EXAMPLE: SALES OF GOODS AND SERVICES, SUBDIVISION 14 WOOD PRODUCT MANUFACTURING

Sales and
service income estimates derived from in scope QBIS data(a)
Quarter \$m
Mar-11 1459
Jun-11 1640
Sep-11 1765
Dec-11 1636
Mar-12 1445
Jun-12 1486
Sep-12 1531
(a) Estimates shown in the table have been
included for illustrative purposes only.

## Creating subdivision

 off-June year factors continuedEXAMPLE 2.1. CALCULATING FACTORS: Sales of goods and services, Subdivision 14 Wood product manufacturing

$$
\begin{aligned}
\text { Off-JuneFactor }_{D E C} & =\frac{(1,765+1,636+1,445+1,486)}{(1,459+1,640+1,765+1,636)} \\
& =\frac{(6,332)}{(6,500)} \\
& =0.974 \\
\text { Off-JuneFactor }_{M A R} & =\frac{(1,765+1,636+1,445+1,486)}{(1,640+1,765+1,636+1,445)} \\
& =\frac{(6,332)}{(6,486)} \\
& =0.976 \\
\text { Off-JuneFactor }_{S E P} & =\frac{(1,765+1,636+1,445+1,486)}{(1,636+1,445+1,486+1,531)} \\
& =\frac{(6,332)}{(6,098)} \\
& =1.038
\end{aligned}
$$

To validate ANZSIC subdivision off-June factors (derived from QBIS data), the following processes were used:

- Subdivision factors that were more than two standard deviations from the across-economy mean of that particular data item and off-June type were identified.
- The QBIS data reported by the top contributors were assessed for consistency between reporting quarters or valid explanation for any differences. Based on these investigations, a decision was made to include or exclude the 'top contributor' unit's data from contributing to the off-June factor. Top contributors to the factors were identified. To do this, units were individually removed and the factor was re-derived. If the absolute difference from the original to the re-derived factors was more than 0.02 for sales, wages and expense factors and 0.05 for inventory factors, then the unit was considered a top contributor.
- By using this methodology, top contributor units were isolated for one of two reasons; either their data showed a significantly different trend to the rest of their industry (ANSZIC subdivision) or their data (consistent or inconsistent) heavily influenced the magnitude of the factor (e.g. a unit's data contributes $30 \%$ of all data feeding into a particular off-June factor)
- A unit's data was generally excluded from the subdivision factor if there was evidence to suggest that the business had undergone activities/events that could not be considered representative of the rest of the industry subdivision. In instances where no evidence exists on which to base the decision to include or exclude a unit's data in the derivation of the factor, the default decision was to include the unit's data to the off-June factor.

The use of unit off-June factors were introduced for estimates presented in this paper. Unit off-June factors were applied to improve the accuracy of off-June adjusted estimates. Unit factors were derived similarly to subdivision factors. The difference between the unit and subdivision factor is that a business' unit factor is derived by using its reported

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CHAPTER 2 • CONCEPTS AND METHODS
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Creating unit off-June factors continued

Quality assurance of unit off-June factors

Applying factors to EAS data

QBIS data only (where the subdivision factor uses all in-scope QBIS data for that subdivision).

Assessment was made on the consistency between reported EAS data and reported QBIS data for the relevant four quarters to ensure that the data was correct. Where there was consistency between the two data sources, the unit received a unit factor. Where consistency did not exist between EAS and QBIS data the unit received the subdivision factor.

In assessing a business' suitability for a unit off-June factor, suitability of QBIS data was also reviewed for inclusion in subdivision factors, based on the criteria described above (see Quality assurance of subdivision off-June factors).

The quality assured off-June factors are then applied to the relevant off-June reporting EAS units.

If an EAS unit was deemed suitable for a unit factor, its reported EAS data is adjusted by its unit factor. Where an EAS unit was not deemed suitable or assessed to receive a unit factor, then its corresponding ANZSIC subdivision's factor for its particular off-June type was applied to reported EAS data.

The off-June year factors are applied to only selected data items from the EAS. The adjusted items are shown in Table 2.4, as well as the factors which were used to adjust them. Note that not all components of the published items have been adjusted, due to a lack of available QBIS data from which to create appropriate factors.

TABLE 2.4. QBIS FACT ORS AND ADJUSTED EAS DAT A ITEMS
Adjusted components

| Published data item | of published data items | Q BIS factor used | Industries adjusted |
| :---: | :---: | :---: | :---: |
| Wages and salaries | Wages and salaries | Wages and salaries | All selected industries ${ }^{\text {b }}$ |
| Total income | Sales and service income | Sales and service income | All selected industries ${ }^{b}$ except Divisions P and Q |
| Total expenses | Wages and salaries <br> Employer contributions into superannuation <br> Worker's compensation premiums <br> Fringe benefits tax <br> Payroll tax | Wages and salaries | All selected industries ${ }^{\text {b }}$ |
|  | Purchases of materials <br> Purchases of finished goods <br> Other intermediate input expenses | Other expenses | All selected industries ${ }^{\text {b }}$ except Divisions P and Q |

Wages and salaries
Employer contributions into superannuation
Worker's compensation premiums $\quad$ Wages and salaries $^{\text {a }} \quad$ All selected industries ${ }^{\text {b }}$
Fringe benefits tax
Payroll tax

|  | Sales and service income | Sales and service Income |
| :--- | :--- | :--- |
|  | Purchases of materials |  |
| Industry Value Added ${ }^{\mathrm{a}}$ | Purchases of finished goods | Other expenses | | Divisions P and Q |
| :--- |
|  |
| Other intermediate input expenses |


| Opening inventories - finished goods | Opening inventories - <br> finished goods plus work- <br> Opening Inventories - work-in- <br> progress |
| :--- | :--- |
| Closing inventories - finished goods | Closing inventories - <br> finished goods plus work- Divisions B, C, D, F, G, H <br> Closing Inventories - work-in- <br> progress |
| Opening inventories - raw materials | Opening inventories - <br> raw materials |
| Closing inventories - raw materials | Closing inventories - <br> raw materials |

a Labour costs are a component of IVA for non-market producers only. See Glossary for more information b Excludes Division A Agriculture, Forestry and Fishing, K Financial and Insurance Services and O Public Administration and Safety. See 'Scope and Population' for more details SUMMARY OF RESULTS

TOTAL SELECTED INDUSTRIES

In 2011-12 for Total selected industries, off-June adjustments increased the original estimate of IVA by $\$ 1.9 \mathrm{~b}$ (or $0.2 \%$ ). Estimates of total income and total expenses increased by $\$ 11.1$ b (or $0.4 \%$ ) and $\$ 13.1$ b (or $0.5 \%$ ) respectively, and the off-June year adjusted estimate of wages and salaries increased $\$ 3.8 \mathrm{~b}$ (or $0.8 \%$ ) from the original estimate.

In absolute values, the industries with the largest difference between original and off-June adjusted estimates of IVA were Mining (\$2.0b or 1.5\%) and Construction (\$1.3b or $1.3 \%$ ).

The industries with the largest increases between original and off-June adjusted total income estimates for 2011-12 were Wholesale trade (\$5.3b or 1.1\%) and Manufacturing ( $\$ 2.3 \mathrm{~b}$ or $0.6 \%$ ). Total income estimates for Education and training and Health care and social assistance remained unchanged, as off-June adjustment factors were not generated for this data item for these industries (see 'Scope and Population' in Chapter 2).

The industry with the largest increase between original and off-June adjusted total expenses estimates in 2011-12 was Wholesale trade (\$5.7b or $1.2 \%$ ).

In 2011-12 the differences between original and off-June adjusted estimates for wages and salaries were minor. The largest adjustment was to Mining (\$1.0b or 4.1\%).

These findings demonstrate that changes in the key estimates of IVA, total income and total expenses were predominantly attributed to movements in the Mining and Wholesale trade industries. As demonstrated in Table 2.1, the off-June reporting businesses in these industries make a substantial contribution to estimates of IVA, and the extent of variation between original and off-June adjusted estimates indicates that these industries were influenced by fluctuations in trading conditions over time. Conversely, although off-June reporting businesses also made a significant contribution to estimates of IVA in Education and training (Table 2.1), off-June adjusted estimates differ only marginally from original values, indicating that this industry experienced minimal variation in trading conditions over time ( See Appendix Table A1.1).

In general, the results presented above were in line with initial expectations, and provide an estimate of the extent of variation caused by the issue of off-June reporting in EAS.

DATA QUALITY

ASSUMPTIONS
UNDERPINNING THE MODEL

When interpreting the experimental estimates in this publication, it is important to take into account reasons that may affect the reliability of the experimental estimates. The quality of the experimental estimates can be limited by:

- the validity of the assumptions underpinning the modelling; and
- the accuracy of the data used in the production of experimental estimates.

The methodology is also limited by restrictions in the scope of the industries adjusted. Off-June adjustments have not been applied to, Agriculture, forestry and fishing and Public administration and safety (ANZSIC Divisions A and O respectively) as QBIS does not collect information from these industries and factors were not able to be produced. Data collected in EAS suggest that the effect of off-June reporting is minor in these industries. Financial and insurance services (ANZSIC Division K) has also been excluded from these experimental estimates.

The modelling methodology used to create the experimental estimates presented in this publication is based on the following assumptions:

- Where a unit factor has been applied for a particular EAS unit, the assumption is the unit's EAS and QBIS data is comparable and their QBIS data accurately reflects quarterly changes in their activity.
- It is valid to only adjust the data reported by businesses with an employment size of 20 or more for off-June reporting. Smaller businesses were excluded as they are relatively minor contributors to the off-June reporting issue
- Where subdivision factors have been applied, businesses with an employment size of 20 or more, that report for a given off-June financial period, and are in the same ANZSIC subdivision, are assumed to face similar trading conditions throughout the year.
- The relationship between EAS data items and QBIS data items is meaningful and consistent. In assessing this it is important to note that:
- There are some scope differences between the businesses included in each survey, the largest of these being that government owned or controlled Public Non-Financial Corporations are excluded from QBIS but included in EAS.
- QBIS and EAS both take their frame from the ABSBR, which is updated quarterly. This leads to minor differences in the businesses available for survey selection between EAS and QBIS, specifically the September, December and March quarterly frames used for QBIS differ from the annual frame used by EAS.
- Some data item concepts vary slightly between QBIS and EAS, however where data items correlate, derived factors from QBIS were applied to the EAS data items.

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CHAPTER 4 • RELIABILITY OF THE EXPERIMENTAL ESTIMATES
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SAMPLING ERROR

NON-SAMPLING ERROR

Both the EAS and QBIS use a sample of businesses, and are thus subject to sampling error. The resultant estimates are likely to differ from those that would have been produced had data been obtained from every business.

One measure of sampling error is the Standard Error, which indicates the extent to which an estimate might have varied by chance because only a sample of businesses was included. There are about two chances in three that a sample estimate will differ by less than one standard error from the figure that would have been obtained if a census were conducted, and about nineteen chances in twenty (i.e. a confidence interval of 95\%) that the difference will be less than two standard errors. Sampling error can also be measured by the Relative Standard Error (RSE) which is obtained by expressing the standard error as a percentage of the estimate to which it refers. RSEs for the four published data items are shown in Table 4.1 below.

### 4.1 RELATIVE STANDARD ERRORS

|  | Wages <br> AND <br> Salaries | Industry |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |
|  |  | Total | Total | value |
|  |  | income | EXPENSES | ADDED |
|  | \% | \% | \% | \% |
| Mining | 0.8 | 0.3 | 0.6 | 0.4 |
| Manufacturing | 0.9 | 0.6 | 0.7 | 1.1 |
| Electricity, gas, water and waste |  |  |  |  |
| Construction | 2.6 | 2.4 | 3.0 | 3.1 |
| Wholesale trade | 4.4 | 1.7 | 1.8 | 5.7 |
| Retail trade | 2.7 | 2.4 | 2.5 | 4.0 |
| Accommodation and food services | 2.9 | 2.1 | 2.4 | 3.0 |
| Transport, postal and warehousing | 2.0 | 1.8 | 1.8 | 1.9 |
| Information Media and |  |  |  |  |
| Telecommunications | 0.8 | 0.8 | 0.8 | 0.8 |
| Rental, hiring and real estate services | 3.6 | 3.5 | 2.6 | 3.4 |
| Professional, scientific and technical |  |  |  |  |
| Administrative and support services | 1.9 | 2.2 | 4.5 | 2.1 |
| Education and training | 1.9 | 3.8 | 3.3 | 3.1 |
| Health care and social assistance | 1.8 | 2.7 | 2.8 | 2.4 |
| Arts and recreation services | 1.9 | 1.6 | 1.8 | 2.3 |
| Other services | 2.5 | 2.5 | 2.5 | 2.9 |
| Total selected industries(a) | 0.6 | 0.7 | 0.7 | 0.8 |

(a) Excludes Division A Agriculture, forestry and fishing, K Financial and insurance services and 0 Public administration and safetr.

There are a range of other potential errors that are not caused by sampling and can occur in any statistical collection. Non-sampling error may be due to inadequacies in available sources from which the ABSBR was compiled; imperfections in reporting by providers; the modelling of QBIS data; and errors made in the collection and processing of data. Although it is not possible to quantify non-sampling error, every effort is made to reduce it to a minimum

## A1. 1 OFF-JUNE ADJUSTSTED ESTIMATES BY INDUSTRY DIVISION

| WAGES AND |  |  |  |  |  | INDUSTRY <br> VALUE ADDED |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SALARIES |  | TOTAL INCOME |  | TOTAL EXPENSES |  |  |  |
| Original | Off-June adjusted | Original | Off-June adjusted | Original | Off-June adjusted | Original | Off-June adjusted |
| \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$m |


| MINING |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2009-10 | 16635 | 17068 | 165230 | 171455 | 115595 | 118151 | 88461 | 92236 |
| 2010-11 | 18894 | 19722 | 218359 | 224007 | 134630 | 139017 | 126641 | 129639 |
| 2011-12 | 23571 | 24538 | 237416 | 236321 | 156816 | 158486 | 132955 | 131015 |


| MANUFACTURING |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2009-10 | 52067 | 52210 | 387658 | 390976 | 360245 | 363962 | 98039 | 99620 |
| 2010-11 | 53434 | 53648 | 395803 | 398256 | 369823 | 374152 | 102547 | 100996 |
| 2011-12 | 55295 | 55701 | 404485 | 406757 | 383344 | 385045 | 102146 | 102795 |


| ELECTRICITY, GAS, WATER AND WASTE SERVICES |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2009-10 | 8950 | 8956 | 93056 | 93603 | 82949 | 83353 | 32102 | 32252 |
| 2010-11 | 9508 | 9554 | 101642 | 101944 | 89398 | 89795 | 35689 | 35674 |
| 2011-12 | 10366 | 10370 | 107472 | 107634 | 95981 | 96008 | 39837 | 39984 |


| CONSTRUCTION(a) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2009-10 | 42881 | 42931 | 287038 | 287570 | 251283 | 251803 | 92759 | 92828 |
| 2010-11 | 47351 | 47573 | 303941 | 305091 | 272485 | 273815 | 92107 | 92182 |
| 2011-12 | 52989 | 53690 | 324933 | 325977 | 293213 | 293799 | 99473 | 100723 |


| WHOLESALE TRADE |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2009-10 | 30256 | 30459 | 407208 | 410398 | 391373 | 397019 | 55629 | 56057 |
| 2010-11 | 32704 | 32945 | 432468 | 434404 | 417536 | 421068 | 60095 | 59392 |
| 2011-12 | 34272 | 34568 | 478345 | 483651 | 463070 | 468785 | 62837 | 62715 |


| RETAIL TRADE |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2009-10 | 35177 | 35200 | 357219 | 357865 | 340828 | 341535 | 63900 | 63927 |
| 2010-11 | 37629 | 37652 | 374235 | 374568 | 354968 | 355166 | 67714 | 67785 |
| 2011-12 | 39102 | 39140 | 383314 | 383971 | 361994 | 362696 | 72111 | 72218 |

[^0]A1.1 OFF-JUNE ADJUSTSTED ESTIMATES BY INDUSTRY DIVISION continued

| WAGES AND |  |  |  |  |  | INDUSTRY VALUE ADDED |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SALARIES |  | TOTAL INCOME |  | TOTAL EXPENSES |  |  |  |
| Original | Off-June adjusted | Original | Off-June adjusted | Original | Off-June adjusted | Original | Off-June adjusted |
| \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$m |

## ACCOMMODATION AND FOOD SERVICES

| $2009-10$ | 17662 | 17688 | 72566 | 72549 | 65042 | 65045 | 31766 | 31776 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $2010-11$ | 19140 | 19155 | 79743 | 79897 | 73362 | 73488 | 34106 | 34150 |
| $2011-12$ | 20217 | 20263 | 86792 | 86888 | 77431 | 77482 | 37411 | 37513 |

TRANSPORT, POSTAL AND WAREHOUSING(a)

| $2009-10$ | 26526 | 26538 | 131063 | 131038 | 119307 | 119319 | 54047 | 54024 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $2010-11$ | 28313 | 28389 | 140799 | 141394 | 127233 | 127496 | 58132 | 58553 |
| $2011-12$ | 31577 | 31781 | 148925 | 149470 | 136844 | 137150 | 62362 | 62840 |

INFORMATION MEDIA AND TELECOMMUNICATIONS (a)

| $2009-10$ | 11638 | 11650 | 74174 | 74436 | 62693 | 62772 | 35340 | 35538 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $2010-11$ | 11992 | 12056 | 77202 | 77537 | 66166 | 66772 | 35497 | 35302 |
| $2011-12$ | 12797 | 12829 | 75572 | 75568 | 66539 | 66643 | 35837 | 35766 |

RENTAL, HIRING AND REAL ESTATE SERVICES(a)

| $2009-10$ | 10959 | 10973 | 97544 | 97663 | 69994 | 70078 | 52481 | 52531 |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | :--- |
| $2010-11$ | 11901 | 11948 | 106093 | 106380 | 77217 | 77380 | 53173 | 53352 |
| $2011-12$ | 12385 | 12419 | 117664 | 117857 | 80612 | 80690 | 60488 | 60643 |

PROFESSIONAL, SCIENTIFIC AND TECHNICAL SERVICES (a)

| $2009-10$ | 53000 | 53046 | 177634 | 178118 | 142935 | 143311 | 85650 | 85820 |
| ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| $2010-11$ | 56684 | 57064 | 194065 | 194971 | 153657 | 154342 | 92189 | 92856 |
| $2011-12$ | 60937 | 61394 | 210976 | 212438 | 158982 | 160378 | 103669 | 104279 |

## ADMINISTRATIVE AND SUPPORT SERVICES(a)

| $2009-10$ | 29162 | 29301 | 67830 | 67990 | 59505 | 59658 | 41309 | 41475 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $2010-11$ | 32229 | 32421 | 72600 | 73041 | 64088 | 64484 | 46230 | 46497 |
| $2011-12$ | 35017 | 35280 | 78047 | 78229 | 72732 | 72861 | 48981 | 49336 |


|  | EDUCATION AND | TRAINING | $($ PRIVATE) (a) (b) |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $2009-10$ | 13167 | 13466 | 27295 | 27295 | 23829 | 24166 | 17221 | 17222 |
| $2010-11$ | 14872 | 15118 | 31832 | 31832 | 26424 | 26697 | 19911 | 19910 |
| $2011-12$ | 15364 | 15578 | 32309 | 32309 | 28081 | 28320 | 20936 | 20939 |

HEALTH CARE AND SOCIAL ASSISTANCE (PRIVATE)(a)(b)

| $2009-10$ | 31721 | 31740 | 81956 | 81956 | 68144 | 68166 | 50412 | 50413 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $2010-11$ | 35511 | 35530 | 89803 | 89803 | 75529 | 75551 | 54805 | 54806 |
| $2011-12$ | 38073 | 38105 | 98625 | 98625 | 80297 | 80334 | 63043 | 63049 |


| ARTS AND RECREATION SERVICES (a) |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2009-10 | 5011 | 5004 | 29595 | 29565 | 25026 | 25014 | 10368 | 10357 |
| 2010-11 | 5442 | 5465 | 30300 | 30301 | 26142 | 26194 | 10906 | 10915 |
| 2011-12 | 5467 | 5485 | 31952 | 31975 | 27320 | 27385 | 11472 | 11475 |

[^1]A1.1 OFF-JUNE ADJUSTSTED ESTIMATES BY INDUSTRY DIVISION continued

|  | WAGES ANDSALARIES |  | TOTAL INCOME |  | TOTAL EXPENSES |  | INDUSTRY VALUE ADDED |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |
|  | Original | Off-June adjusted | Original | Off-June adjusted | Original | Off-June adjusted | Original | Off-June adjusted |
|  | \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$m |
| OTHER SERVICES (a) |  |  |  |  |  |  |  |  |
| 2009-10 | 14278 | 14310 | 54451 | 54451 | 46638 | 46615 | 23317 | 23366 |
| 2010-11 | 15481 | 15548 | 59259 | 59367 | 50515 | 50664 | 25268 | 25336 |
| 2011-12 | 16911 | 17022 | 61106 | 61353 | 53087 | 53393 | 28438 | 28565 |
| TOTAL SELECTED INDUSTRIES (b) |  |  |  |  |  |  |  |  |
| 2009-10 | 399088 | 400540 | 2511516 | 2526927 | 2225385 | 2239967 | 832799 | 839441 |
| 2010-11 | 431085 | 433789 | 2708145 | 2722791 | 2379172 | 2396082 | 915009 | 917347 |
| 2011-12 | 464338 | 468165 | 2877935 | 2889022 | 2536344 | 2549453 | 981998 | 983856 |

(a) No adjustment has been applied to inventories due to a lack of available QBIS data.
(b) Excludes Division A Agriculture, forestry and fishing, K Financial and insurance services and O Public administration and safetr.

## GLOSSARY

$\left.\begin{array}{ll}\text { ABSBR } & \begin{array}{l}\text { The Australian Bureau of Statistics Business Register. This contains a list of all businesses } \\ \text { in Australia, sourced from the Australian Taxation Office. Most entities are represented }\end{array} \\ \text { by an Australian Business Number. This is suitable for ABS statistical needs when the } \\ \text { business is simple in structure, however more significant and diverse businesses are } \\ \text { profiled directly by the ABS. }\end{array}\right\}$

## Industry value added (IVA) continued

plus Capital work done for own use
plus Closing inventories
less Opening inventories
less Purchases of goods and materials
less Other intermediate expenses
equals IVA
However, it should be noted that IVA is a measure of economic activity and is not equivalent to operating profit before tax (OPBT). Wage and salary expenses and most other labour costs are not taken into account in the calculation for market producers, and neither are interest expenses, depreciation or a number of lesser expenses. On the income side, OPBT includes total income, whereas IVA only includes sales and service income and government funding for operational costs.

As a principle, the output of non-market production is valued at cost, including intermediate input expenses. As shown in the above derivation, purchases and other intermediate input expenses are deducted from output in order to arrive at IVA.

Accordingly, the derivation of IVA for non-market producers can be described as follows:
Selected labour costs
plus Depreciation and amortisation
equals IVA
Estimates of industry value added are obtained by summing the contributions of businesses classified to that industry, both market and (if any) non-market producers. Market producers predominate in most industries.

Industry value added is related to, but different from, the national accounting variable gross value added. For national accounts purposes, gross value added is calculated by adjusting IVA to include General government units and also to account for some other effects.

Off-June reporting In annual surveys, businesses are asked to report their operations for the standard financial year. In Australia, this is July 1st to June 30th, however the standard financial year differs between countries. Off-June reporting occurs when a business is unable to report the standard financial year, and instead supplies information for a different, 'off-June' year. Many off-June reporters are companies which are based overseas, while some Australian businesses are off-June reporters for other reasons. For example, most schools report for a calendar year (1st January to 31 December) in order to align with the school year.

Opening inventories The value of all inventories of finished goods (including inventories for resale), work-in-progress (less progress payments billed), raw materials, fuels and containers at the beginning of the reporting period.

Other expenses In the QBIS collection, refers to all expenses other than selected labour costs (see the entry for Total expenses), interest, depreciation and amortisation, capital repayments, costs associated with the transfer of real estate, dividends, donations, export freight charges, extraordinary losses, foreign exchange losses, goods and service tax (GST), excise and duties payable to governments, income tax and other direct taxes, losses on asset sales, and unrealised gains/losses from revaluations of assets. The major items that are included are intermediate input expenses (defined in the entry for Total expenses).

Payroll tax A tax levied by state and territory governments on the amount of wages and salaries paid by a business. Excludes pay-as-you-go withholding tax.

Purchases of goods and
Purchases (of materials, components, containers, packaging materials for manufacture or construction, purchases of finished goods for resale and delivery charges separately invoiced or itemised by suppliers) plus capitalised purchases (goods drawn from
$\qquad$
inventories for use as fixed tangible assets in capital work done by the employees or proprietors of a business for use by the business or for rental or lease).

Reference period For each collection year, businesses are asked to report data for the year ended 30 June However, if a business has a different financial year, it is asked to report for a 12 month period which ends between 1 October of the previous year and 30 September of the current year. This period is then used as a substitute for the financial year ended 30 June. For example, for the 2010-11 collection, a business may have reported data for the year ended 31 December 2010.

Includes:

## Sales of goods

- whether or not produced by the business (including goods produced for the business on a commission basis). Includes export sales, sales or transfers to related businesses or to overseas branches of the business, progress payments relating to long term contracts if they are billed in the period, delivery charges not separately invoiced to customers, sales of goods produced by the business from crude materials purchased, and income from 'specific' rates (e.g. water, sewerage, irrigation and drainage rates). Excludes excise and duties received on behalf of the government (e.g. the petroleum production excise duty), sales of assets, natural resource royalties income, interest income, and delivery charges separately invoiced to customers. Exports are valued free on board, i.e. export freight charges are excluded.


## Income from services

- includes income from consulting services, repair, maintenance and service income and fees, contract, subcontract and commission income, management fees/charges from related and unrelated businesses, installation charges, delivery charges separately invoiced to customers and royalties from intellectual property (e.g. patents and copyrights) and natural resource royalties income. Excludes interest income, and delivery charges not separately invoiced to customers.


## Rent, leasing and hiring income

- derived from the ownership of land, dwellings, buildings and other structures, motor vehicles, plant, machinery and other equipment. Excludes royalties from mineral leases, income from finance leases and payments received under hire purchase arrangements.

These are valued net of discounts given and exclusive of goods and services tax (GST). Extraordinary items are also excluded

The above definitions are equivalent for both EAS and QBIS, with the exception that natural resource royalties income is not included as part of sales and service income for the QBIS collection.

Total expenses The sum of all expense components.
Total income
Comprises sales and service income, interest income, funding from government for operational costs and other income.

## Total selected industries

Total selected industries comprises data for all ANZSIC divisions, excluding ANZSIC Division A - Agriculture, forestry and fishing, Division K - Financial and insurance services and Division O - Public administrative and safety. For a detailed discussion of the scope and coverage of the estimates, see Chapter 2 - Scope and Population. Units classified to the General government or Rest of the world institutional sectors are excluded from the scope of estimates for most industries that comprise Total selected industries. This limits coverage to private sector entities and government-owned or controlled Public non-financial corporations.

Wages and salaries

## Workers' compensation <br> premiums/costs

The gross wages and salaries (including capitalised wages and salaries) of all employees of the business. The item includes severance, termination and redundancy payments, salaries and fees of directors and executives, retainers and commissions of persons who received a retainer, bonuses, and annual and other types of leave. Provision expenses for employee entitlements (e.g. provisions for annual leave and leave bonus, long service leave, sick leave, and severance, termination and redundancy payments) are also included, as are salary sacrificed earnings and remuneration of employees in the form of share based payments and stock options.

Payments related to self-employed persons such as consultants, contractors and persons paid solely by commission without a retainer are excluded. The drawings of working proprietors and partners are also excluded.

Workers' compensation is a compulsory insurance cover to be taken out by all employers, except for self-insured workers, according to legislative schemes to cover employees suffering injury or disease in the course of or arising out of employment.

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| :--- |
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## FREE ACCESS TO STATISTICS

All statistics on the ABS website can be downloaded free of charge.

WEB ADDRESS www.abs.gov.au


[^0]:    (a) No adjustment has been applied to inventories due to a lack of available QBIS data.

[^1]:    (a) No adjustment has been applied to inventories due to a lack of available QBIS data.
    (b) No adjustment has been applied to sales and service income due to a lack of available QBIS data.

